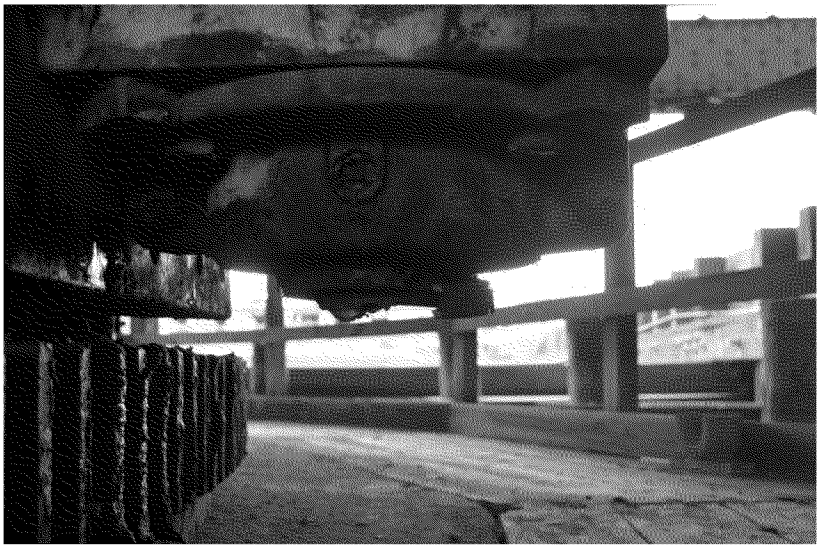
Bridge Street Bridge – Status on September 1, 2013, 13:00

The Bridge Street Bridge opened and closed without incident for the regularly scheduled barge transit on August 31 at 4 AM. Hudson County's electrical contractor was on site for this opening to install a toggle switch that would allow the bridge operators to adjust the speed of the opening without the presence of the electrical contractor until such time as a final electrical repair could be made. The operators decided to perform one more test of this system after the CPG barges cleared all the Hudson-Essex bridges. It was during this test that BSB failed to close after successfully opening.

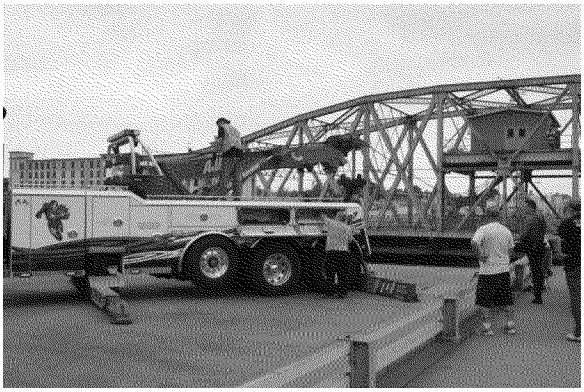
Most obvious cause of failure: one of two main shafts that turn the gear that turns the turntable, sheared for an as yet undiagnosed reason. A photo of the shaft on the Newark side of the bridge follows. This shaft is currently intact. It is topped by a series of gears that are driven by another shaft that runs to the center of the turntable. The gear at the bottom of this assembly spins the turntable.

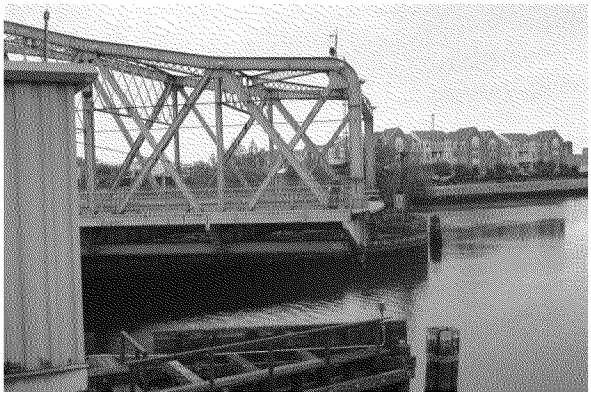
The same type of assembly on the Harrison side of the bridge is the one that failed. A photo of the bottom of the assembly where the shaft failed follows. This photo was taken after the bridge was closed. The failure occurred when it was in the open position which is why the gear is not currently under the shaft.



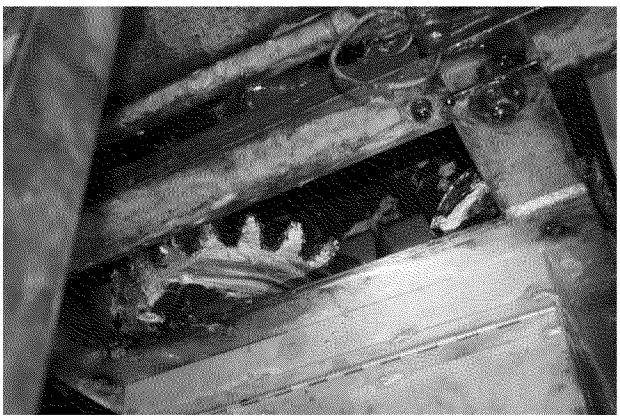
A photo of the gear in the place where it came off the shaft follows next. Hopefully a metallurgy expert can determine if this is a failure of the 100+ year old steel shaft, or a failure from there being unexpected resistance leading to excessive torque beyond the design capabilities of this gear set. Nobody mentioned failure of any shear pin within this assembly.

Because the Newark-side shaft appeared to be intact, the operators attempted to use the motor that controls those gears and shafts to close the bridge. But when that was attempted, the shaft would not turn, and a clunking sound could also be heard. While there were fears that the shaft was getting bound up, mechanical inspection and what appeared to minimal resistance when the bridge was closed by a tow truck cable indicated the additional problem was elsewhere. Following are photos of the bridge being closed by the tow truck.

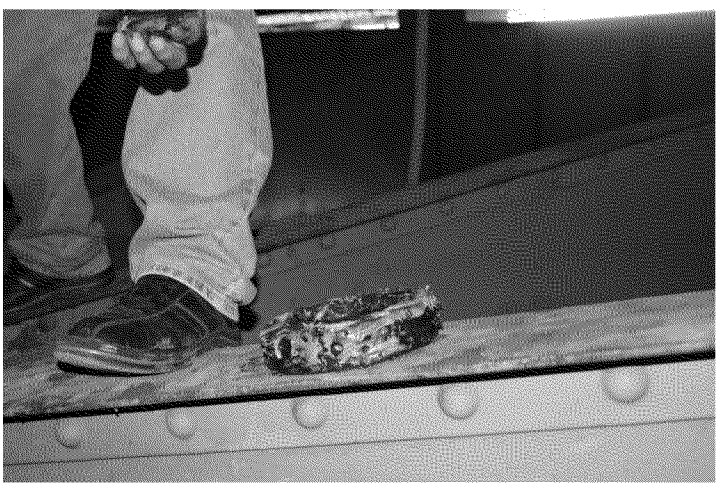




After the bridge was reset in the closed position, additional inspection of the drive shafts and gears close to the motor assemblies revealed that a smaller gear that would connect the main motor to the shaft that runs to the outer circle of the turntable, had somehow unscrewed itself. Photos of the displaced gear and the shaft on which it is normally placed follows.



Hudson County is currently attempting to get their mechanical contractor in to replace this gear and re-secure it with the screw coupling that had been holding it in place. That coupling was removed from the shelf of the casing during this inspection and is shown in the following photo.



Hudson County is also soliciting guidance from TranSystems, an engineering firm that evaluated the bridge and recommended repairs after Hurricane Sandy. If Hudson County is assured that operating the bridge with only one gear assembly in place will not further damage the bridge, the bridge will be placed back in operation. At that point, CPG can resume barge movements. CPG will be monitoring this situation as it develops.